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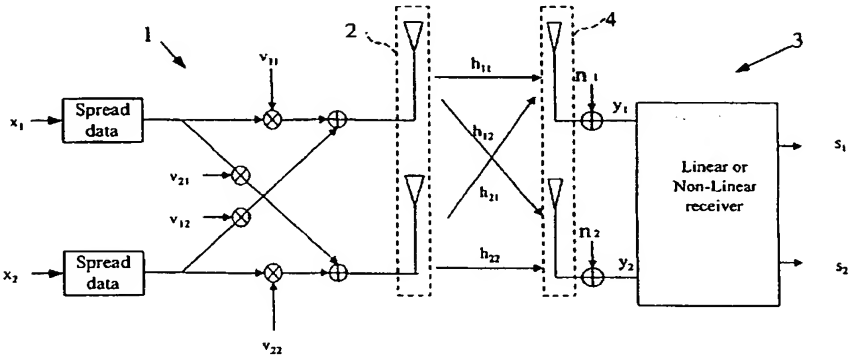
(54) Title: WIRELESS COMMUNICATION USING MULTI-TRANSMIT MULTI-RECEIVE ANTENNA ARRAYS



(57) Abstract: A method of closed-loop multi-stream wireless communication between a transmitter (1) comprising a transmit antenna array of N transmit antenna elements and a reciever (3) comprising a receive antenna array (4) of M receive antenna elements, wherein a plurality of distinct data steams (x1 X2) are transmitted from the transmit antenna array to the receive antenna array and the data streams are weighted by respective complex weighting matcices before being applied to the transit antenna array. The distinct data steams are separated and estimated at the reciever. The distinct data streams (x1 xG) are applied to respective sub-groups (6,7) of the transmit antenna elements at least one of which comprises a plurality of the transmit antenna elements each of the sub-groups comprising at least Nd transmit antenna elements, where M is greater than or equal to (N/Nd). The complex weighting matrices (v1 to vn) are functions of the respective transmission channels (hij) of the data streams (x1, to xG) including the respective sub-groupes of transmit antenna elements. Nd is preferably greater than or equal to two. Each of the complex weighting matrices is calculated to be substantially equal to the eigenvector corresponding to the largest eigenvalue of the matirx H H, where H is the matrix of the equvalent channel including the respective sub-groups of transmit antenna elements (6,7) seen by the corresponding data stream HH is the Hermitian transform of the matrix H. The number of the transmit antenna elements in each of the sub-groups is preferablly re-configurable during operation as a function of channel conditions.

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